REMARKS

Claims 50 and 62 have been amended to make clearer the type of machine in which the system of the present invention is used. Support is found at page 1 line 5 of the specification. The nature of hot and cold die casting machines is well known to those skilled in the art and so no further definition of such machines should be required. For the examiner's convenience, enclosed herewith is a brief description of these types of machines obtained from the internet site http:/www.diecasting.com/die_casting_process.htm which was visited on February 16, 2006. This makes it clear that both types of machines have supplies of molten metal which is forced into the die by direct pressure from a plunges. Such machines are capable of producing much greater pressures and velocities than are possible with equipment in which a screw mechanism is present in the feeder to the die.

New claims 68 - 79 are directed to a pressure die casting machine containing a system as previously claimed in which the nature of the machine is defined functionally by the velocities that can be produced in the runner leading to the die cavity. Support for this functional definition of the machine is found at page 5 line 1 of the specification. Otherwise claims 68 - 79 parallel claims 50 - 61.

The basic issue raised in the most recent rejections under 35 USC 102 and 103 is what exactly is the nature of the feature shown at region 45 of the Kato reference. The examiner states that it is a controlled expansion region. The specification says that it is a sprue (see column 6 line 47). Sprues are not controlled expansion regions. Sprues exist in many different casting machines. Their nature is discussed in the attached declarations of Drs Stephen P. Midson and Morris T. Murray which also point out yet again the differences between what is now claimed and what is described in Kato.

Among the important points made by these declarations are the following:

1. The Examiner has simply assumed that sprue 45 of Kato et al has a funnel shape consistent with the drawing, whereas the shape is merely the outer shape of the sprue. As shown by the Midson and Murray declarations and as is shown graphically in Fig 3 of the exhibit to the Midson declaration, this outer shape of the sprue complements an internal cone which fits within the funnel shape so that there is in fact a reduction in the cross sectional area of the flow path within the sprue, not an expansion as required by the present invention. The part of the flow path through sprue 45 is not an expansion zone, but rather a constriction

through which the alloy will increase in flow velocity relative to flow through the preceding nozzle;

2 Kato et al is devoid of any disclosure or suggestion as to a reduction in flow velocity, while the normal best practice in the art is of progressively increasing flow velocity along the flow path;

3. Kato et al teaches only thermal control (progressive heating) to change the alloy from solid to semi-solid to molten, and a change in state from molten to semi-solid is contrary to the express teaching of Kato et al;

4. Prior to the present invention, it was not known that a magnesium alloy could be caused to change from the molten state to the semi-solid state other than by thermal control (cooling), let alone while flowing from a source of supply to a die cavity in the course of a casting cycle as a consequence of flow velocity control. Nothing in Kato et al is remotely suggestive of this.

Additionally, it should be noted that all of the claims now require that the claimed subject matter relates to apparatus in which there can be high velocity of the molten metal prior to reaching the expansion zone, this either being expressly stated as in claims 68 - 79 or the necessary implication of the definition of the apparatus as being a hot chamber or cold chamber die casting machine in the case of claims 50 - 67. In such machines, direct pressure is exerted on molten metal by a plunger to force it towards a die cavity or mold The Kato machine is of a different type. The presence of a screw mechanism in the feed to the cavity precludes such high speeds being able to be accomplished.

In this context it should be noted that the Examiner errs in asserting that the apparatus of the Kato is "capable to have a flow velocity between 140 to 165 m/s that assertion depends on the Examiner's incorrect belief that sprue 45 is a controlled expansion region, a belief which is strongly refuted by one of the co-inventors (Murray) and an independent expert (Midson). Thus, the assertion fails to be material due to sprue 45 not being such a region but in fact a constriction which contributes to compliance with the normal best practice of progressively increasing flow velocity along the flow path. However, the apparatus is lacking that capability apart from this reason, due to the apparatus inherently being unable to achieve velocities required by the invention. The screw rotates and longitudinally retracts to move alloy to the nozzle, and then is advanced longitudinally towards the nozzle to fill the die

cavity. Prior to the screw advancing, alloy at and in the nozzle has zero longitudinal flow velocity and substantial modification of the apparatus would be necessary to achieve the very high flow velocities required by the invention. There is a complete absence of motivation to provide such modification.

Typically one would not seek to slow the flow of a material into a mold. It is counter-intuitive to do so. Nothing in the prior art suggests constructing pressure casting equipment which makes a deliberate provision for slowing the flow of the metal just prior to its entry into the die cavity.

The invention as claimed in all claims complies with the requirements of both of sections 202 and 103 of Title 35 of the U.S. Code.

It is submitted that this application is now in order for allowance and an early action to this end is respectfully solicited.

Respectfully submitted

John Richards
LADAS & PARRY
26 West 61st. Street
New York, New York 10023
Reg. 31053
Tel. (212) 708-1915